

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of using a computer to predict ~~predicting~~ a life of a rolling bearing having a specification which a basic dynamic load rating C and a basic static load rating C_0 are calculable,

wherein, when a dynamic equivalent load is P, a load index is p, a viscosity ratio of a lubricant is κ , a contamination degree coefficient is a_c , a fatigue limit load is P_u , and a life correction coefficient is a_{NSK} , causing the computer to calculate a corrected rating life L_A of the rolling bearing at a certain reliability coefficient a_1 is calculated by the following relations:

$$L_A = a_1 \cdot a_{NSK} \cdot (C/P)^p$$

$$a_{NSK} \propto f[F(\kappa), \{(P - P_u)/C\} \cdot 1/a_c];$$

wherein a function $F(\kappa)$ of the viscosity ratio κ is set as a lubrication parameter a_l , and

wherein the life correction coefficient a_{NSK} is calculated on the basis of the lubrication parameter a_l and a load parameter $\{(P - P_u)/C\} \cdot 1/a_c$.

2. (Currently Amended) The method according to claim 1, wherein a material coefficient a_m is applied to the contamination degree coefficient a_c as a degree of influence of steel at which the life is prolonged by a component of the steel and a heat treatment, and the contamination degree coefficient a_c is calculated by:

—— $a_c = g(a_m, a_c)$ set in view of a material coefficient a_m as a degree of influence of steel at which the life is prolonged by a component of the steel and a heat treatment.

3. (Canceled)

4. (Original) An apparatus for predicting a life of a rolling bearing having a specification which a basic dynamic load rating C and a basic static load rating C_0 are calculable, comprising:

a data information inputting means for inputting data information including the basic dynamic load rating C and the basic static load rating C_0 of said rolling bearing;

a dynamic equivalent load calculating means for calculating a dynamic equivalent load on the basis of the data information input by said data information inputting means;

a reliability setting means for setting a reliability coefficient;

a lubrication parameter calculating means for calculating a lubrication parameter on the basis of the inputting data information;

a contamination degree setting means for setting a contamination degree;

a fatigue limit load calculating means for calculating a fatigue limit load;

a load parameter determining means for determining a load parameter on the basis of the basic dynamic load, the dynamic equivalent load, the fatigue limit load, and the contamination degree coefficient;

a life correction coefficient setting means for setting a life correction coefficient on the basis of the lubrication parameter and the load parameter; and

a bearing life calculating means for calculating the life of the bearing on the basis of the reliability coefficient, the life correction coefficient, the basic dynamic load rating, the dynamic equivalent load, and a load index.

5. (Currently Amended) The apparatus according to claim 4, wherein said contamination degree setting means sets a contamination degree coefficient in view of a material coefficient as a degree of influence of steel at which the life is prolonged by a component of the steel and a heat treatment.

6. (Original) The apparatus according to claim 5, wherein said life correction coefficient setting means calculates the life correction coefficient on the basis of the load parameter and the lubrication parameter and with reference to a life correction coefficient calculation map which indicates relationships among values of the parameters and the life correction coefficient with using the lubrication parameter as a parameter.

7. (Original) The apparatus according to claim 4, wherein said lubrication parameter calculating means calculates a viscosity ratio κ which is a ratio of a kinematic viscosity ν of a used lubricant at an operating temperature to a required viscosity ν_1 at the operating temperature, from an operating kinematic viscosity ν of the used lubricant, a mean diameter d_m of said bearing, and a rotation number N of said bearing.

8. (Original) The apparatus according to claim 7, wherein said life correction coefficient setting means calculates the life correction coefficient on the basis of the load parameter and the lubrication parameter and with reference to a life correction coefficient calculation map which indicates relationships among values of the parameters and the life correction coefficient with using the lubrication parameter as a parameter.

9. (Original) The apparatus according to claim 4, wherein said life correction coefficient setting means calculates the life correction coefficient on the basis of the load parameter and the lubrication parameter and with reference to a life correction coefficient calculation map which indicates relationships among values of the parameters and the life correction coefficient with using the lubrication parameter as a parameter.

10. (Original) The apparatus according to claim 4, further comprising:
an exhibiting means for exhibiting the life of the bearing which is calculated by said bearing life calculating means.

11. (Original) An apparatus for predicting a life of a rolling bearing having a specification which a basic dynamic load rating C and a basic static load rating C_0 are calculable, comprising:

a data information inputting means for inputting data information including the basic dynamic load rating C and the basic static load rating C_0 of said rolling bearing;

a dynamic equivalent load calculating means for calculating a dynamic equivalent load on the basis of the data information input by said data information inputting means;

a reliability setting means for setting a reliability coefficient;

a lubrication parameter calculating means for calculating a lubrication parameter on the basis of the inputting data information;

a contamination degree setting means for setting a contamination degree;

a fatigue limit load calculating means for calculating a fatigue limit load;

a load parameter determining means for determining a load parameter on the basis of the basic dynamic load, the dynamic equivalent load, the fatigue limit load, and the contamination degree coefficient;

a life correction coefficient setting means for setting a life correction coefficient on the basis of the lubrication parameter and the load parameter;

a bearing life calculating means for calculating the life of the bearing on the basis of the reliability coefficient, the life correction coefficient, the basic dynamic load rating, the dynamic equivalent load, and a load index; and

a recalculation judging means for judging whether, when a calculation result of said bearing life calculating means fails to coincide with a desired life, a recalculation for making the calculation result coincident with the desired life is required or not.

12. (Currently Amended) The apparatus according to claim 11, wherein said contamination degree setting means sets a contamination degree coefficient in view of a material coefficient serving as a degree of influence of steel at which the life is prolonged by a component of the steel and a heat treatment.

13. (Original) The apparatus according to claim 12, wherein said life correction coefficient setting means calculates the life correction coefficient on the basis of the load parameter and the lubrication parameter and with reference to a life correction coefficient calculation map which indicates relationships among values of the parameters and the life correction coefficient with using the lubrication parameter as a parameter.

14. (Original) The apparatus according to claim 11, wherein said lubrication parameter calculating means calculates a viscosity ratio κ which is a ratio of a kinematic viscosity ν of a used lubricant at an operating temperature to a required viscosity ν_1 at the operating temperature, from an operating kinematic viscosity ν of the used lubricant, a mean diameter d_m of said bearing, and a rotation number N of said bearing.

15. (Original) The apparatus according to claim 14, wherein said life correction coefficient setting means calculates the life correction coefficient on the basis of the load parameter and the lubrication parameter and with reference to a life correction coefficient calculation map which indicates relationships among values of the parameters and the life correction coefficient with using the lubrication parameter as a parameter.

16. (Original) The apparatus according to claim 11, wherein said life correction coefficient setting means calculates the life correction coefficient on the basis of the load parameter and the lubrication parameter and with reference to a life correction coefficient calculation map which indicates relationships among values of the parameters and the life correction coefficient with using the lubrication parameter as a parameter.

17. (Original) The apparatus according to claim 11, further comprising:
an exhibiting means for exhibiting the life of the bearing which is calculated by said bearing life calculating means.

18. (Original) A rolling bearing selection apparatus using an apparatus for predicting a life of a rolling bearing, comprising:

a bearing kind inputting means for inputting a bearing kind which is desired by a user;

a data information inputting means for inputting necessary data information other than required data information required by the user, from necessary data information including the basic dynamic load rating C and the basic static load rating C_0 of said rolling bearing;

a data information assuming means for comparing the required data information which is input by said data information inputting means with said necessary data information, and assuming data information which is not input;

said life predicting apparatus for predicting a life of a rolling bearing according to claim 4 which performs calculation of predicting the bearing life on the basis of the data information which is input by said data information inputting means and the data information which is assumed by said data information assuming means;

a judging means for judging whether a calculation result of said life predicting apparatus satisfies the data information which is input by said data information inputting means or not;

a data information exhibiting means for, when a judgement result of said judging means indicates that the calculation result satisfies the data information, exhibiting the data information which is set by said data information assuming means; and

a recalculating means for, when the judgement result of said judging means indicates that the calculation result does not satisfy the data information, changing the data information which is assumed by said data information assuming means, and causing said life predicting apparatus to again perform the calculation.

19. (Original) The rolling bearing selection apparatus according to claim 18, wherein at least one of said data information inputting means, said data information assuming means, said life predicting apparatus, said judging means, said data information exhibiting means, and said recalculating means is accessible through an Internet.

20. (Original) The rolling bearing selection apparatus according to claim 19, further comprising:
a user registration accepting means for accepting user registration through the Internet,
wherein only a user who is registered in said user registration accepting means is allowed to access at least one of said data information inputting means, said data information assuming means, said life predicting apparatus, said judging means, said data information exhibiting means, and said recalculating means, through the Internet.

21. (Original) The rolling bearing selection apparatus according to claim 19, wherein a language which is handled in said data information inputting means, said data information assuming means, said apparatus for predicting a life of a rolling bearing, said judging means, said data information exhibiting means, and said recalculating means is selectable.

22. (Original) The rolling bearing selection apparatus according to claim 18, wherein said data information exhibiting means performs at least one of exhibition of prediction of the life of the rolling bearing, exhibition of an optimum bearing, and exhibition of optimum service condition.

23. (Original) The rolling bearing selection apparatus according to claim 18, wherein said data information exhibiting means exhibits at least one of prediction of the life of the rolling bearing, an optimum bearing, and optimum service condition, as image information in which a parameter is changeable.

24. (Original) The rolling bearing selection apparatus according to claim 23, wherein the image information is displayed as a characteristic diagram in which one axis indicates a predicted value of the life, and another axis indicates one selected from a bearing size, a bearing load, a rotation speed, a kind of a lubricant, a degree of contamination, a service temperature, a material kind, and a reliability coefficient.

25. (Original) The rolling bearing selection apparatus according to claim 18, further comprising:
a delivery information exhibiting means for exhibiting at least one of a delivery time and an estimated amount of the rolling bearing based on the data information exhibited by said data information exhibiting means.

26. (Currently Amended) A computer-readable storage medium storing a life prediction computer program product embodied thereon for predicting a life of a rolling bearing having a specification which a basic dynamic load rating C and a basic static load rating C_0 are calculable, ~~said program executing the steps of;~~

said computer program product comprising code that, when executed, causes a computer to perform the following:

inputting data information including the basic dynamic load rating C and the basic static load rating C_0 of said rolling bearing;

calculating a dynamic equivalent load on the basis of the data information which is input in said data information inputting step;

setting a reliability coefficient;

calculating a lubrication parameter on the basis of the data information;

setting a contamination degree;

calculating a fatigue limit load;

determining a load parameter on the basis of the basic dynamic load, the dynamic equivalent load, the fatigue limit load, and the contamination degree;

setting a life correction coefficient on the basis of the lubrication parameter and the load parameter;
and

calculating the life of the bearing on the basis of the reliability coefficient, the life correction coefficient, the basic dynamic load rating, the dynamic equivalent load, and a load index.

27. (Currently Amended) A computer-readable storage medium storing a life prediction computer program product embodied thereon for predicting a life of a rolling bearing having a specification which a basic dynamic load rating C and a basic static load rating C_0 are calculable, ~~said program executing the steps of:~~

said computer program product comprising code that, when executed, causes a computer to perform the following:

inputting data information including the basic dynamic load rating C and the basic static load rating C_0 of said rolling bearing;

calculating a dynamic equivalent load on the basis of the data information which is input in said data information inputting step;

setting a reliability coefficient;

calculating a lubrication parameter on the basis of the data information;

setting a contamination degree;

calculating a fatigue limit load;

determining a load parameter on the basis of the basic dynamic load, the dynamic equivalent load, the fatigue limit load, and the contamination degree;

setting a life correction coefficient on the basis of the lubrication parameter and the load parameter;

calculating the life of the bearing on the basis of the reliability coefficient, the life correction coefficient, the basic dynamic load rating, the dynamic equivalent load, and a load index; and

judging whether, when a calculation result of said bearing life fails to coincide with a desired life, a recalculation for making the calculation result coincident with the desired life is required or not.

28. (Original) A storage medium storing a bearing selection program for selecting a rolling bearing according to a specification required by a user, said program executing the steps of:

inputting a bearing kind which is desired by the user;

inputting necessary data information other than required data information required by the user, from necessary data information including the basic dynamic load rating C and the basic static load rating C_0 of said rolling bearing;

comparing the required data information with the necessary data information to assume data information which is not input;

predicting a life by using the life prediction program according to claim 26 on the basis of the required data information and assumed data information other than the required data information;

judging whether a result of the life prediction satisfies the required data information or not;

exhibiting the assumed data information as bearing selection information, when the life prediction result satisfies the required data information; and,

changing the assumed data information, and causing said life prediction program to again perform the calculation, when the life prediction result does not satisfy the required data information.